Request for Economic Stimulus Funds

Concept Proposal

Submitters (Name of Workgroup & Chair/Co-Chairs):

Robin Zhang and Haluk Cetin, Murray State University

Project Title:

Flood zone mapping using LIDAR data in the Purchase region of western Kentucky

Project Partners (Known or Anticipated):

Mr. Bob Jost, Purchase Area Development District, Mayfield, KY

Mr. Xulong Peng, Purchase Area Development District, Mayfield, KY

Dr. Tom Mueller, Soil and Water Conservation and Management, University of Kentucky

Dr. Christine McMichael, Morehead State University

Project Background & Purpose (Justification for Project):

The Purchase area of western Kentucky borders the Mississippi River on the west, the Ohio River on the north, the Tennessee River and the Kentucky Lake on the east. The region is relatively flat and has seasonally high water table. It is subject to severe floods that cause property damage and loss of lives.

Effectiveness of flood mitigation planning needs accurate mapping of flood zones. FEMA provides flood zone maps, but many streams and rivers are not currently mapped by FEMA, including many in Kentucky. For many flood zones on the FEMA map, a base flood elevation is not determined. Furthermore, for the areas that have been mapped by FEMA, the information is often outdated. To accurately map the flood zone and modeling flood events for better planning and hazard mitigation, a high quality digital elevation model is essential.

LIDAR technology uses laser light ranging to detect heights, simultaneously collecting 3D information for the bare earth, vegetation and structure. It can achieve measurements that are

accurate within centimeters for all three dimensions. After hurricane Floyd, North Carolina became the first state to map the flood zones using LIDAR. In May 2008, the second National Light Detecting and Ranging Initiative Strategy Meeting, hosted by the USGS, NASA and the Association of American State Geologists. The report from the meeting stated that the LIDAR technology was available to achieve greater good.

Project Description (General Goals & Implementation Strategies):

This project aims to establish a pro-type project in the Purchase region for flood zone mapping, in hoping to expend the project in the future to map and update the flood zone along Kentucky's over 89,000 miles of streams and rivers. The project will explore the data collection specifications for adequate mapping of flood zones and develop standard data processing procedures for the mapping task. We will test the different laser configurations and spacing requirements, and apply different processing tools and develop new methods for the cleaning up and information extraction. In addition to flood zone mapping and updating, information about the riparian forests, flood plain land use, etc., can be obtained from the dataset. Results from the experiment could yield important guidelines for LIDAR applications in these areas throughout Kentucky.

Project Team (Project Manager(s), Content Experts, Instructional Designers, etc.):

Managers: Robin Zhang and Haluk Cetin

Content experts: Robin Zhang, Haluk Cetin, Bob Jost, Xulong Peng, Tom Mueller, Christine McMichael

Project Budget & Amount of Economic Stimulus Funds Requested:

Estimated budget: $1.2-1.4 Million

Economic Stimulus Funds Requested: $1.2-1.4 Million